Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A piezoelectric/electrostrictive film type actuator comprising:

a ceramic substrate comprising a plurality of laminated thin plate layers and having a cavity formed in an internal portion thereof; and

a piezoelectric/electrostrictive device disposed on one surface of said ceramic substrate and including a plurality of piezoelectric/electrostrictive films and electrode films;

wherein said piezoelectric/electrostrictive films and said electrode films are alternately laminated such that electrode films form uppermost and lowermost layers of said piezoelectric/electrostrictive device; ~~and~~

wherein said actuator is driven by displacement of said piezoelectric/electrostrictive device such that said uppermost electrode film moves and said cavity is pressurized by deforming a part of a wall thereof with said piezoelectric/electrostrictive device;

wherein a thickness of said piezoelectric/electrostrictive device, when viewed in cross-section, decreases from a central portion thereof toward opposite outer portions thereof; and

wherein an upper surface of said piezoelectric/electrostrictive device, when viwed in cross-section, has a convex arcuate shape, and a radius of curvature of said convex arcuate shape originates from a point located below said one surface of ceramic substrate.

2. (Previously Presented) The piezoelectric/electrostrictive film type actuator according to claim 1, wherein said piezoelectric/electrostrictive device includes two to four layers of said piezoelectric/electrostrictive films.

3. (Previously Presented) A piezoelectric/electrostrictive film type actuator comprising:

a ceramic substrate; and

a piezoelectric/electrostrictive device disposed on said ceramic substrate and including a plurality of piezoelectric/electrostrictive films and electrode films;

wherein said piezoelectric/electrostrictive films and said electrode films are alternately laminated such that electrode films form uppermost and lowermost layers of said piezoelectric/electrostrictive device;

wherein a thickness t_n of an n-th piezoelectric/electrostrictive film from the bottom of said piezoelectric/electrostrictive device satisfies the following equation: $t_n \leq t_{n-1} \times 0.95$; and

wherein said actuator is driven by displacement of said piezoelectric/electrostrictive device.

4. (Previously Presented) The piezoelectric/electrostrictive film type actuator according to claim 1, wherein a per layer thickness of said piezoelectric/electrostrictive films is 30 μm or less.

5. (Previously Presented) The piezoelectric/electrostrictive film type actuator according to claim 1, wherein at least one layer of said piezoelectric/electrostrictive films is formed by electrophoresis deposition.

6. (Previously Presented) The piezoelectric/electrostrictive film type actuator according to claim 1, comprising two or more of said piezoelectric/electrostrictive devices disposed on said ceramic substrate.

7. (Cancelled).

8. (Previously Presented) The piezoelectric/electrostrictive film type actuator according to claim 1, wherein said ceramic substrate comprises two or three laminated thin plate layers.

9. (Previously Presented) The piezoelectric/electrostrictive film type actuator according to claim 1, wherein a thickness of a thinner portion of said ceramic substrate is 50 μm or less.

10. (Previously Presented) The piezoelectric/electrostrictive film type actuator according to claim 1, wherein said ceramic substrate comprises a material selected from the group consisting of materials containing zirconium oxide, aluminum oxide, magnesium oxide, aluminum nitride, and silicon nitride as a major component.

11. (Previously Presented) The piezoelectric/electrostrictive film type actuator according to claim 1, wherein said ceramic substrate comprises a material containing either partially stabilized zirconium oxide or completely stabilized zirconium oxide as a major component.

12. (Previously Presented) An ink pump of a printer head disposed in an ink jet printer comprising the piezoelectric/electrostrictive film type actuator according to claim 1.

13. (Previously Presented) A piezoelectric/electrostrictive film type actuator comprising:

a ceramic substrate having a cavity formed in an internal portion thereof; and

a piezoelectric/electrostrictive device disposed on one surface of said ceramic substrate and including a plurality of piezoelectric/electrostrictive films and electrode films;

wherein an uppermost one of said electrode films moves and said cavity is pressurized by deforming a part of a wall thereof with said piezoelectric/electrostrictive device; and

wherein said piezoelectric/electrostrictive film type actuator is formed by a method comprising the steps of:

preparing a green sheet laminate including at least one green sheet as a substrate and one or more green sheets each having at least one hole portion formed therein;

sintering said green sheet laminate to obtain a ceramic laminate;

forming an electrode film (A) on an outer surface of said ceramic laminate by a first film forming method;

forming a piezoelectric/electrostrictive film (A) on said electrode film (A) by a second film forming method;

forming an electrode film (B) on said piezoelectric/electrostrictive film (A) by said first film forming method;

repeating the steps of forming said piezoelectric/electrostrictive film (A) and electrode film (B) one or more times;

forming a piezoelectric/electrostrictive film (B) on said electrode film (B) by said second film forming method;

forming an electrode film (C) on said piezoelectric/electrostrictive film (B) by said first film forming method; and

sintering said piezoelectric/electrostrictive films and/or said electrode films a predetermined number of times at arbitrary times between said step of forming said electrode film (A) and said step of forming said electrode film (C).

14. (Previously Presented) A piezoelectric/electrostrictive film type actuator comprising:

a ceramic substrate having a cavity formed in an internal portion thereof; and

a piezoelectric/electrostrictive device disposed on said ceramic substrate and including a plurality of piezoelectric/electrostrictive films and electrode films;

wherein said cavity is pressurized by deforming a part of a wall thereof with said piezoelectric/electrostrictive device; and

wherein said piezoelectric/electrostrictive film type actuator is formed by a method comprising the steps of:

preparing a green sheet laminate including at least one green sheet as a substrate and one or more green sheets each having at least one hole portion formed therein;

sintering said green sheet laminate to obtain a ceramic laminate;

forming an electrode film (A) on an outer surface of said ceramic laminate by a first film forming method;

forming a piezoelectric/electrostrictive film (A) on said electrode film (A) by a second film forming method;

forming an electrode film (B) on said piezoelectric/electrostrictive film (A) by said first film forming method;

repeating the steps of forming said piezoelectric/electrostrictive film (A) and electrode film (B) one or more times;

forming a piezoelectric/electrostrictive film (B) on said electrode film (B) by said second film forming method;

forming an electrode film (C) on said piezoelectric/electrostrictive film (B) by said first film forming method; and

sintering said piezoelectric/electrostrictive films and/or said electrode films a predetermined number of times at arbitrary times between said step of forming said electrode film (A) and said step of forming said electrode film (C);

wherein a thickness t_n of an n-th piezoelectric/electrostrictive film satisfies the following equation: $t_n \leq t_{n-1} \times 0.95$.

15. (Previously Presented) The piezoelectric/electrostrictive film type actuator according to claim 13, wherein said step of forming said electrode film (B) includes sintering said electrode film (B) at a sintering temperature of Tm1 (°C), and wherein said step of forming said piezoelectric/electrostrictive film (B) includes sintering said piezoelectric/electrostrictive film (B) at a sintering temperature of Tm2 (°C), such that the following equation is satisfied:
$0 \leq Tm2 - Tm1 \leq 300$.

16. (Previously Presented) The piezoelectric/electrostrictive film type actuator according to claim 13, wherein said first and said second film forming methods each comprise at least one of a plurality of film forming methods, such that each of said electrode films and each of said piezoelectric/electrostrictive films are formed by the same or a different film forming method.

17. (Previously Presented) The piezoelectric/electrostrictive film type actuator according to claim 13, wherein said first and said second film forming methods each comprise at least one thick film forming method selected from the group consisting of screen printing, dipping, coating, and electrophoresis deposition.

18. (Previously Presented) The piezoelectric/electrostrictive film type actuator according to claim 13, wherein said second film forming method comprises screen printing to form a first piezoelectric/electrostrictive film, and electrophoresis deposition to form second and subsequent piezoelectric/electrostrictive films.

19. (Previously Presented) The piezoelectric/electrostrictive film type actuator according to claim 13, wherein said step of forming said green sheet laminate comprises laminating two or three green sheets each having at least one hole portion formed therein.

20. (Previously Presented) An ink pump of a printer head disposed in an ink jet printer comprising the piezoelectric/electrostrictive film type actuator according to claim 13.

21. (Previously Presented) A method of manufacturing a piezoelectric/electrostrictive film type actuator comprising a ceramic substrate having a cavity formed in an internal portion thereof, and a piezoelectric/ electrostrictive device disposed on one surface of said ceramic substrate and including a plurality of piezoelectric/electrostrictive films and electrode films, wherein an uppermost one of said electrode films moves and said cavity is pressurized by deforming a part of a wall thereof with said piezoelectric/electrostrictive device, said method comprising the steps of:

A) preparing a green sheet laminate including at least one green sheet as a substrate and at least one green sheet having at least one hole portion formed therein and sintering said green sheet laminate to obtain a ceramic laminate;

B) forming an electrode film (A) on an outer surface of said ceramic laminate by a first film forming method;

C) forming a piezoelectric/electrostrictive film (A) on said electrode film (A) by a second film forming method;

D) forming an electrode film (B) on said piezoelectric/ electrostrictive film (A) by said first film forming method;

E) repeating steps C and D one or more times;

F) forming a piezoelectric/electrostrictive film (B) on said electrode film (B) by said second film forming method; and

G) forming an electrode film (C) on said piezoelectric/electrostrictive film (B) by said first film forming method;

wherein said piezoelectric/electrostrictive films and/or said electrode films are sintered a predetermined number of times at arbitrary times between said electrode film (A) is formed in step B and said electrode film (C) is formed in step G.

22. (Previously Presented) A method of manufacturing a piezoelectric/electrostrictive film type actuator comprising a ceramic substrate having a cavity formed in an internal portion thereof, and a piezoelectric/electrostrictive device disposed on said ceramic substrate and including a plurality of piezoelectric/electrostrictive films and electrode films, wherein said cavity is pressurized by deforming a part of a wall thereof with said piezoelectric/electrostrictive device, said method comprising the steps of:

A) preparing a green sheet laminate including at least one green sheet as a substrate and at least one green sheet having at least one hole portion formed therein and sintering said green sheet laminate to obtain a ceramic laminate;

B) forming an electrode film (A) on an outer surface of said ceramic laminate by a first film forming method;

C) forming a piezoelectric/electrostrictive film (A) on said electrode film (A) by a second film forming method;

D) forming an electrode film (B) on said piezoelectric/electrostrictive film (A) by said first film forming method;

E) repeating steps C and D one or more times;

F) forming a piezoelectric/electrostrictive film (B) on said electrode film (B) by said second film forming method; and

G) forming an electrode film (C) on said piezoelectric/ electrostrictive film (B) by said first film forming method;

wherein said piezoelectric/electrostrictive films and/or said electrode films are sintered a predetermined number of times at arbitrary times between said electrode film (A) is formed in step B and said electrode film (C) is formed in step G; and

wherein a thickness t_n of an n-th piezoelectric/ electrostrictive film satisfies the following equation: $t_n \leq t_{n-1} \times 0.95$.

23. (Previously Presented) The method according to claim 21, wherein said step D includes sintering said electrode film (B) at a sintering temperature of Tm1 (°C), and wherein said step F includes sintering said piezoelectric/electrostrictive film (B) at a sintering temperature of Tm2 (°C), such that the following equation is satisfied: $0 \leq Tm2 - Tm1 \leq 300$.

24. (Previously Presented) The method according to claim 21, wherein said first film and said second forming methods each comprise at least one of a plurality of film forming methods such that each of said electrode films and each of said piezoelectric/electrostrictive films are formed by the same or a different film forming method in the respective steps.

25. (Previously Presented) The method according to claim 21, wherein said first and said second film forming methods each comprise at least one thick film forming method selected from the group consisting of screen printing, dipping, coating, and electrophoresis deposition.

26. (Previously Presented) The method according to claim 21, wherein said second film forming method comprises screen printing to form a first piezoelectric/ electrostrictive film and electrophoresis deposition to form second and subsequent piezoelectric/electrostrictive films.

27. (Previously Presented) The method according to claim 21, wherein each of said at least one laminated green sheets of step A that form said substrate have at least one hole portion formed therein.

28. (Previously Presented) The method according to claim 27, wherein said at least one laminated green sheet comprises two or three laminated green sheets.

29. (Previously Presented) An ink pump of a printer head disposed in an ink jet printer comprising an actuator formed according to the method of claim 21.

30. (Previously Presented) The method according to claim 16, wherein said first and said second film forming methods are the same.

31. (Previously Presented) The method according to claim 24, wherein said first and said second film forming methods are the same.